SENTINEL BRIDGE HAER NO. CA-94
Yosemite National Park Roads and Bridges
Spanning Merced River on Sentinel Bridge Crossover Road
Yosemite National Park
Mariposa County
California



PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
P.O. Box 37127
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HISTORIC AMERICAN ENGINEERING RECORD

SENTINEL BRIDGE
Yosemite National Park
HAER No. CA-94

I. INTRODUCTION

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| Location: | Sentinel Bridge carries the Sentinel Bridge Crossover Road across the Merced River, one-half mile southwest of Yosemite Village, Yosemite National Park, Mariposa County, California.<br><br>QUAD: HALF DOME, CA<br>UTM: 11/271890/4180300 |
| Date of Construction: | 1918-19 |
| Designer and Builder: | National Park Service.<br><br>Contractors: Gutleben Brothers |
| Original and Present Owner: | Yosemite National Park, National Park Service. |
| Structure Type: | Three-span reinforced concrete beam bridge |
| Fhwa Structure No.: | 8800-006P |
| Present Use: | Park road bridge. |
| Significance: | Sentinel Bridge is the oldest surviving Merced River bridge in Yosemite National Park; it originally carried the main traffic load over the river at the site of the Old Yosemite Village, once the center of activity in the Valley. |
| Project Information: | Documentation of Sentinel Bridge is part of the Yosemite National Park Roads and Bridges Recording Project, conducted in summer 1991 by the Historic American Engineering Record.<br><br>Richard H. Quin, Historian |

## II. HISTORY

This report was prepared for the Yosemite National Park Roads and Bridges Recording Project. HAER No. CA-117, YOSEMITE NATIONAL PARK ROADS AND 8RIDGES, contains an overview history of the park roads.

## HISTORY OF SENTINEL 8RIDGE

Sentinel Bridge, oldest of the Merced River bridges in Yosemite Valley, is a three-span reinforced concrete beam structure dating from 1918-1919. The 153' long bridge is supported by stone abutments of native granite and two granite piers resting on concrete footings. The bridge is 28' wide, carrying a two-lane road, the Sentinel Bridge Crossover, with a clear roadway width of 20' and 3' sidewalks on each side. Due to increasing traffic loads, the structure was considerably altered in 1960. The bridge deck was raised and widened and the original guard rail supported by stone pylons was replaced with a new aluminum guard rail. The bridge is presently slated for replacement.

The first bridge on the site was erected about 1859 by Gustavus Adolphus Hite, who had a small hotel on the east bank of the river about five hundred yards north of the present bridge. Hite's bridge was a crude log structure which only remained in place a few years. Some time before 1865 this structure was replaced by entrepreneur James Mason Hutchings with another log bridge. Hutching's bridge was washed away by a flood on 23 December 1867. Although the damaged structure lay on the river bank a short distance downstream, Hutchings had a new bridge built. This replacement span was a truss bridge of finished lumber. In 1872, Hutchings noted it was the only bridge in Yosemite Valley, the other bridges having washed away.[1]

In 1878, the Commissioners replaced Hutching's 8ridge with an all-metal iron bridge, which from early photographs can be identified as an uncommon Bowstring-arch truss, a tied arch with the diagonals serving as bracing and the verticals supporting the deck. It was at first called the "Upper Iron 8ridge;" after the construction of the Sentinel Hotel, it was called the "Sentinel Hotel Bridge," or Sentinel Bridge. The bridge measured 96' long.[2] The "Old" Yosemite Village, near which it was located, was once the center of activity in the Yosemite Valley. In addition to the Sentinel Hotel, the Old Village contained other boarding houses and hotels as well as a number of smaller houses, studios, and other concessions.

The Sentinel 8ridge was rehabilitated in 1898 and continued in use for another two decades, although in later years it was clearly inadequate. Repairs were made by army troops in 1908.[3] In 1911, Maj. William W. Forsyth, Acting Superintendent of the park, called for replacement of the existing Sentinel Bridge with a new reinforced concrete structure four times as wide. In his annual report to the Secretary of the Interior, he complained that the existing bridge was wide enough only to permit passage of a single wagon, and that the structure was in a dilapidated condition. Forsyth noted that because of the attractive view from the bridge, visitors liked to gather there, but were compelled to move whenever a wagon team sought to cross.[4] The bridge was refloored in 1913 but not widened as Forsyth had recommended; the cost of the repairs was only $34.[5]

Plans for a new Sentinel 8ridge were drawn up by the Interior Department and put out to bid in 1915.[6] However, it would be another three years before the bridge was replaced. In his 1916 annual report, Yosemite National Park Superintendent Washington 8. Lewis noted that the bridge had been condemned and posted for a three-ton load. Heavy trucks had to be shunted over the El Capitan 8ridge, which had a six-ton load restriction. The situation caused

delays and additional costs for transporting goods. Lewis urged speedy replacement of the Sentinel Bridge, followed by the replacement of Pohono, Happy Isles and Stoneman bridges over the Merced River and the Tenaya Creek bridge. The replacement structures should each bear loads of at least fifteen tons.[7]

In 1916 and 1917, a new park maintenance area was developed on the north side of the Valley near the base of Yosemite Falls. Over the next few years, employee residences and operation facilities were relocated to the "New" Yosemite Village from the Old Village on the south side of the Merced River. To facilitate the traffic flow between the two centers, the old Sentinel Bridge was replaced in 1918-19 with a new reinforced concrete structure.[8] The new open deck structure was 97' long (measured from center of support to center of support) and 23' wide, and carried two lanes of traffic. The abutments, wing walls, and the upper parts of the two piers were of reinforced concrete covered with a granite veneer. The bridge originally had a simple concrete deck with molded concrete brackets on the sides of the supporting beams. The structure was distinguished by lanterns atop stone approach pylons and posts over the piers. Contractors for the project were the Gutleben Brothers of Stockton, California; the firm had recently completed the rambling Glacier Point Hotel.[9] A sum of $8,000 was appropriated for the project, but proved insufficient.[10]

By the mid-1930s, the National Park Service's Board of Expert Advisors for Yosemite National Park were discussing the increasingly heavy traffic carried by the bridge, and board member Frederick Law Olmsted, Jr. made several suggestions for the upgrading of the bridge. He suggested raising the roadbed to the existing sidewalk grade and widening the road by using the existing sidewalk. A new sidewalk would be constructed on an extension of the deck. He admitted that the proposed deck changes would require redesign of the railings and other parts of the superstructure.[11] Despite Olmsted's recommendations, the bridge was not remodeled for another twenty-five years.

Plans to widen the bridge were at last announced in November 1960, and the structure was widened and substantially remodeled by the end of the year.[12] The changes drastically affected the original appearance of the bridge. The deck was raised about 4' on new precast prestressed concrete double-tee beams, and the original concrete guard walls were replaced with new formed aluminum rails on curved brackets. The old stone lanterns and guard rail pylons that had distinguished the original structure were removed. The road was widened from 16' to 20' wide. The reconstruction work was done by Jack Campbell of Fresno at a cost of $28,250.[13] Following completion, the bridge was covered with a bituminous surface treatment under a separate contract. These changes had the effect of severely altering the original architectural character of the structure.

An inspection by the Federal Highway Administration in 1977 found the bridge to be structurally deficient and resulted in a report recommending the bridge be scheduled for replacement by 1982. The report noted conspicuous cracking at the points where the cantilevered girders meet, longitudinal cracks in the prestressed sidewalks, efflorescence of the concrete and scouring at the abutments.[14]

The Sentinel Bridge crossing has been used continuously since 1859, and the present structure, though altered, still reflects the typical bridge design of the National Park Service's engineering division in the decade between the 1916 creation of the Park Service and the 1925 agreement with the Bureau of Public Roads when the BPR took over the design of major road structures. Ansel Adams' famous photograph, "Moon Over Half Dome," was taken from the bridge, and many photographers today try to recreate this photograph. As of

this writing (1991), plans were being finalized for the removal of the bridge and its replacement with a stone-faced reinforced concrete structure a short distance upstream.

III. ENDNOTES

1. "Sentinel Bridge," Typed MSS, n.d., Yosemite Research Library; Linda Wedel Greene, *Yosemite, The Park and Its Resources: A History of the Discovery, Management, and Physical Development of Yosemite National Park, California*. 3 vols. (Washington, D.C.: National Park Service, 1987), I:67-68; James M. Hutchings, *In the Heart of the Sierras, the Yo Semite Valley, Both Historical and Descriptive, and Scenes by the Way; the Big Tree Groves, the High Sierra, with its Magnificent Scenery, Ancient and Modern Glaciers, and Other Points of Interest, with Tables of Distances and Altitudes, Maps, Etc., Profusely Illustrated*. (Oakland, CA: Pacific Press Publishing House, 1886; reprint ed., Lafayette, CA: Great West Books, 1990), 399.

2. Greene, 68*n*; Hutchings, 138b; Lawrence V. Degnan to Douglass H. Hubbard, Park Naturalist, 8 August 1957. Yosemite Research Library collection.

3. Greene, I:415.

4. *Ibid.*, I:69*n*; William W. Forsyth, Major, Sixth Cavalry. "Acting Superintendent's Report, Yosemite National Park," in "Report of the Director of the National Park Service to the Secretary of the Interior, 1911," *Reports of the Department of the Interior*, 1920 (Washington, D.C: Government Printing Office, 1920), 11.

5. Gabriel Sovulewski, Park Supervisor's Report, 15 October 1913, in *Report of the Acting Superintendent of the Yosemite National Park to the Secretary of the Interior*, 1913, (Washington, D.C.: Government Printing Office, 1913), 25.

6. Mark Daniels, "Report of the Landscape Engineer of the National Parks," in *Reports of the Department of the Interior*, 1915, 2 vols. (Washington, D.C.: Government Printing Office, 1916), I:850.

7. Washington B. Lewis, "Report of the Superintendent of Yosemite National Park" in *Reports of the Department of the Interior*, 1916, I:790.

8. Robert C. Pavlik, "In Harmony with the Landscape: Yosemite's Built Environment, 1913-1940," *California History* LXIX (Summer 1990), 184-85.

9. "Sentinel Bridge" MSS.

10. "Bridge in Yosemite to Get a Face-Lifting," (San Francisco) *Examiner*, 13 November 1966, 8.

11. Thomas E. Carpenter, Branch of Plans and Designs, National Park Service, "Resume of Conference held at San Francisco office, October 14, 1935, on Proposed Developments by the Park Operator on the Floor of Valley, and Location for the Sentinel Bridge," typed MSS, 15 October 1935. Yosemite Research Library collections.

12. "Historic Sentinel Bridge Being Widened," Yosemite National Park press release, 4 November 1960; Greene, I:69*n*.

13. See National Park Service, Western Office Division of Design and Construction, "Widen Sentinel Bridge" construction drawings, February 1960. Copy at NPS/Denver Service Center; also, "Bridge in Yosemite to Get a Face-Lifting," 8.

14. Lonnie E Moss, Bridge Safety Inspection Report, Sentinel Bridge. (Denver, CO: Federal Highway Administration, Office of Western Bridge Design, 19 January 1977), 1-2, 4.

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